REMARKS

Claims 1-10 are pending in this application.

The Examiner maintains the rejection of claims 1-10 under 35 U.S.C. § 103(a) as being unpatentable over Vesely (US 3,856,912) in view of Toshiyuki (JP 08-034619). Applicants respectfully traverse the rejection.

The present invention provides a method for separating and recovering a catalytic component-supporting wash coat from a metallic carrier catalytic device, which is characterized in that a metallic carrier catalytic device which is composed of a metallic carrier having a wash coat thereon, and a noble metal-containing catalytic component which is supported on the wash coat, is treated with an aqueous solution of **mixed acid which contains sulfuric acid and nitric acid** (claim 1).

The present invention also provides a method for recovering noble metals from a metallic carrier catalytic device, wherein noble metals are recovered by any known method from catalytic component-supporting wash coat which has been separated and recovered by a method **as mentioned in claim 1**, and from the aqueous solution of **mixed acid** which has been used to treat the metallic carrier catalytic device (claim 6).

Vesely does not disclose or suggest treating a deactivated catalyst such as platinum-alumina with a **"mixed acid" of sulfuric acid and nitric acid**, as claimed.

First, the method disclosed in the reference is for the recovery of platinum from a deactivated catalyst, basically comprising the following two steps:

(i) a step of initially treating a deactivated catalyst such as a platinum-alumina composition with a strong acid; and

(ii) a step of recovering platinum from a platinum-containing residue, which is obtained after the treatment in step (i). See col. 1, line 57 – col. 2, line 54.

The Examiner refers to col. 2, lines 36-45 of the reference and argues that nitric acid is mixed with hydrochloric acid in the working example, and sulfuric acid can be used instead of hydrochloric acid as the "other alternative." See page 3, lines 7-9 of the Office Action.

The Examiner further argues that "Vesely teaches use of different acids like sulfuric acid, hydrochloric acid, nitric acid and the like with the catalyst. In the working example, mixture of hydrochloric acid and nitric acid are used with ratio of 3:1 at temperature from 165°F (74°C) to

185°F (85°C). Therefore it would have been obvious to use any of the acid stated above in the mixture for recovery of platinum." See page 4, lines 7-11 of the Office Action.

However, the Examiner is confusing the acid which is used for the above-mentioned step (i), with **aqua regia** (a mixture of hydrochloric acid and nitric acid at a ratio of 3:1) which is used for step (ii). Thus, the Examiner's understanding of the referene is fundamentally wrong and inconsistent with the practice of those of ordinary skill in the art.

In the first step (i) of Vesely, alumina, in a platinum-alumina composite, is made to react with a strong acid, such as sulfuric acid, hydrochloric acid, nitric acid and the like, and is thereby converted into a soluble compound of alumina. In the second step (ii), a platinum-containing residue, which is obtained from the first step (i), reacts with aqua regia and, as a result of which the platinum in the residue is dissolved in the aqua regia.

Accordingly, the purpose of use (or the function) of the strong acid in the first step (i) of Vesely is quite different from the purpose of use (or the function) of the aqua regia in the second step (ii). One of ordinary skill in the art would recognize that the use of aqua regia, as taught in the second step (ii) of Vesley's method, is completely different from the use of a strong acid in the first step (i). Therefore, it would not have been obvious to one of ordinary skill in the art to have used sulfuric acid in place of hydrochloric acid in the first step (i) of Vesley's method.

Second, with respect to the use of a strong acid in the first step (i), the reference merely teaches the following:

> With catalyst other than platinum-alumina, the acid or base employed is dependent on the refractory inorganic oxide involved. Thus, where the refractory inorganic oxide is beryllium oxide, a concentrated sulfuric acid is suitably employed, and when the refractory inorganic oxide is vanadium oxide, nitric acid is suitable.
> See col. 1, line 64 – col. 2, line 3.

Thus, the reference does not teach or suggest the use of two species of acids, such as sulfuric acid and nitric acid, in combination, as strong acids with which to convert refractory inorganic oxide in the deactivated catalyst into a soluble compound in the first step (i).

Nitric acid does not react with alumina to convert it into a soluble compound. Therefore, one of ordinary skill in the art would not have had any reason or rationale to use nitric acid **in combination** with sulfuric acid in the first step (i) of Vesely.

Third, the Examiner states "Using above stated acids together (mixed) would give predictable result of recovery of platinum from catalyst" (see page 4, lines 11-12). Applicants respectfully disagree.

The examples in the present specification show that the combined mixture of sulfuric acid and nitric acid results in a much higher yield of recovering noble metals, as compared to the use of sulfuric acid alone, that is, the present invention provides superior and unexpected results over the prior art that would not have been predictable.

Beginning on page 4 of the Office Action, the Examiner purports to respond to Applicants' previous patentability arguments concerning the use of a "mixed acid" in accordance with the present invention. **However, the Examiner has not responded to that portion of Applicants' previous patentability arguments which are concerned with the comparative results set forth in the present specification, as referred to in the third paragraph on page 7 of the previous response.**

Thus, in Examples 1 and 2 of the present specification, the metallic carrier catalytic device as manufactured in Referential Example 1 was dipped in an aqueous solution containing **a mixture of 20% by weight of sulfuric acid and 2% by weight of nitric acid**. Table 1 shows the noble metal recovery rate in Example 1 as follows: **Pt = 93.1%, Pd = 86.8% and Rh = 79.3%**, and the noble metal recovery rate in Example 2 as follows: **Pt = 99.9%, Pd = 99.9% and Rh = 99.9%.** See page 7, line 5 – page 8, line 28 of the specification, and Table 1.

On the other hand, in Comparative Example 1, the same operation as Example 1 was carried out except that an aqueous solution having **20% by weight of sulfuric acid was used in place of a mixture of 20% by weight of sulfuric acid and 2% by weight of nitric acid.** Table 1 shows the noble metal recovery rate in Comparative Example 1 was significantly lower, as follows: **Pt = 72.4%, Pd = 74.0% and Rh = 51.5%.** See page 8, lines 24-32 of the specification, and Table 1.

Accordingly, Examples 1 and 2 show that the **combined mixture of sulfuric acid and nitric acid** results in a much higher yield of recovering noble metals as compared to the use of sulfuric acid alone, as in Comparative Example 1. **These are superior results that would not have been predictable or expected to one of ordinary skill in the art.**

Fourth, the Examiner states that "It would have been obvious to a person of ordinary skill in the art to perform the process of Vesely including a metal carrier for the alumina support in

view of Toshiyuki because the use of the supported catalyst in a combustion engine, where purifying of exhaust gas takes place at high temperature and pressure." See page 3, lines 1-4 of the Office Action.

However, as discussed above, Vesely does not teach or suggest using a **mixture of sulfuric acid and nitric acid** for the purpose of dissolving alumina from a platinum-alumina composite. Thus, even if the metal carrier substrate of Toshiyuki had been applied to the process of Vesely, it would not have been obvious, or even possible, to achieve the presently claimed invention.

The Examiner states that Toshiyuki is used to show that the use of alumina as a carrier is well-known in the art. See page 5, lines 1-2 of the Office Action. **However, Toshiyuki teaches away from the presently claimed invention.**

Example 1 of Toshiyuki provides 30 vol% of sulfuric acid solution. On the other hand, Comparative Example 6 of the reference (using nitric acid rather than sulfuric acid) shows that almost all of the noble metals (Pt, Pd and Rh) remained in the metallic carrier substrate, and that it was impossible to dissolve noble metals in the nitric acid solution. See paragraph [0031], Table 4 and the Abstract of the partial English translation of Toshiyuki cited in the IDS filed February 2, 2007.

Accordingly, as demonstrated by Comparative Example 6, Toshiyuki teaches away from using nitric acid. Therefore, one of ordinary skill in the art would not have been motivated to use a **combined mixture of sulfuric acid and nitric acid**.

Therefore, claims 1 and 6 would not have been obvious over Vesely in view of Toshiyuki.

Claims 2-5 and 7-10 depend directly or indirectly on claims 1 and 6, and thus also would not have been obvious over the references.

For these reasons, Applicants take the position that the presently claimed invention is clearly patentable over the applied references.

Therefore, it is submitted that the rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

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